

# FLOOR COVERING BASED ON PERFORATED PVC SHEET

## BACKGROUND OF THE INVENTION

### 1. Field of the invention

The present invention relates, in general, to a floor covering based on perforated PVC (polyvinyl chloride) sheet, and in particular, to a floor covering based on perforated PVC sheet, in which a surface material such as wood or Korean paper is attached to a upper side of a high density perforated PVC sheet.

### 2. Description of the Prior Art

A demand for a PVC floor covering, in which a wood surface layer is attached to a PVC sheet, has been growing as high quality architectural interior finish having appearance and feel of wood. However, the PVC floor covering has disadvantages in that the PVC sheet has a different thermal expansion coefficient from the wood layer, and so a surface of the floor covering is not smoothly maintained owing to cracks or curling of the surface.

To avoid the above disadvantages, Korean Laid-open Publication No. 1998-047176 discloses a grained timber PVC floor covering, in which a back sheet is attached to a lower

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side of a high density PVC sheet, or non-woven fabric is inserted between a grained timber and the PVC sheet, and joined. However, this conventional invention has disadvantages in that an effect of preventing cracks or curling of the surface is not sufficient because the grained timber PVC floor covering does not sufficiently offset shrinkage or expansion differences between the grained timber and the PVC sheet due to use of a back sheet or non-woven layer, and that cracks or curling of the surface are not prevented because shrinkage or expansion differences between the grained timber and the PVC sheet are not offset in the PVC sheet.

#### SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a floor covering based on perforated PVC sheet, which can maintain a smooth surface without cracks or curling of the surface.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in

conjunction with the accompanying drawings, in which:

Fig. 1 schematically illustrates a cross sectional view of a floor covering according to the present invention;

Fig. 2 schematically illustrates a top view of a high density perforated PVC sheet according to the present invention;

Figs. 3a to 3d schematically illustrate cross sectional views of various layered structures of the high density perforated PVC sheets according to the present invention;

Figs. 4a to 4d schematically illustrates cross sectional views of other layered structures of the high density perforated PVC sheets according to the present invention; and

Figs. 5a to 5d schematically illustrates various layered structures of the floor coverings according to the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

Referring to Fig. 1, a cross sectional view of the floor covering according to the present invention is illustrated, wherein a surface material 2 such as wood or Korean paper is attached to a upper side of a high density perforated PVC sheet 1 by an adhesive layer 3.

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An example of the surface material 2 further includes textile fabric, fiber reinforced plastics (FRP), and thermosetting resin sheet.

The high density perforated PVC sheet 1 has multiple  
5 holes 1a formed on a surface thereof, as shown in Figs. 1 to 4. The high density PVC sheet of the present invention is highly densified to a specific gravity of  $2.0 \text{ g/cm}^2$  or more by adding a filler such as barium sulfate ( $\text{BaSO}_4$ ) in conjunction with an excess of calcium carbonate to the PVC  
10 sheet, unlike a conventional PVC sheet.

The hole 1a may form any shape such as a circle, a quadrangle, a lozenge, and a triangle.

With reference to Fig. 2, holes may be arranged in such a way that two columns of holes 1a with a width  
15 interval  $l$  and a length interval  $l'$  are arranged at regular interval, or holes may be arranged in such a way that the width and length intervals are same as each other, but which is not to be construed to limit the present invention.

Turning now to Figs. 3a to 3d, various layered  
20 structures of the high density perforated PVC sheets according to the present invention are illustrated, wherein the high density perforated PVC sheets 1-1 to 1-5 are joined with heat in such a way that holes 1a of each PVC sheet are not aligned with holes of adjoining other PVC sheets.

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25 Figs. 3a to 3d illustrate two perforated PVC sheets 1-

1 and 1-2 joined with heat, three sheets 1-1, 1-2, and 1-3,  
four sheets 1-1, 1-2, 1-3, and 1-4, and five sheets 1-1, 1-2,  
1-3, 1-4, and 1-5, respectively. Maximally, twenty  
perforated PVC sheets joined with heat can be used in the  
5 present invention.

Referring to Figs. 4a to 4d, other layered structures  
of the high density perforated PVC sheets according to the  
present invention are illustrated, wherein the high density  
perforated PVC sheets are joined with heat in such a way  
10 that holes 1a of each PVC sheet communicate with holes of  
adjoining other PVC sheets. Figs. 4a to 4d illustrate two  
perforated PVC sheets 1-1 and 1-2 joined with heat, three  
sheets 1-1, 1-2, and 1-3, four sheets 1-1, 1-2, 1-3, and 1-4,  
five sheets 1-1, 1-2, 1-3, 1-4, and 1-5, respectively.  
15 Maximally, twenty high density perforated PVC sheets joined  
with heat can be used in the present invention.

With reference to Figs. 5a to 5d, various layered  
structures of the floor coverings according to the present  
invention are illustrated, wherein the layered structure  
20 comprises a surface layer, a substrate layer, and a back  
layer. In Figs. 5a to 5c, a wood thin board 2 with a UV  
coating layer 4 is used as the surface layer. As for the  
substrate layer, a high density perforated PVC sheet 1, a  
high density perforated PVC sheet 1 whose upper side is  
25 attached to a glass fiber sheet 5, and a high density

perforated PVC sheet 1 whose lower side is attached to a glass fiber sheet 5 are used in Figs. 5a to 5c, respectively. In Fig. 5d, the wood thin film 2 with the UV coating layer 4 is used as the surface layer, a high density perforated PVC sheet 1 whose upper side is attached to a glass fiber sheet 5 is used as the substrate layer, and a high density perforated PVC sheet 1 whose lower side is attached to a glass fiber sheet 5 is used as the back layer.

The glass fiber sheet 5 may be substituted with non-woven fabric, PVC sheet, rubber sheet, or foamed synthetic resin.

As described above, the present invention has advantages in that the floor covering removes shrinkage and expansion differences between the PVC sheet and the surface material because multiple holes 1a of the high density perforated PVC sheet 1 offset shrinkage or expansion of the PVC sheet owing to temperature changes, thereby the floor covering of the present invention can be used for a long time under conditions of changing temperature without cracks, bubbling, and curling of the surface of the floor covering.

Another advantage of the floor covering according to the present invention is that the floor covering is excellent in vibration absorptivity, adiabatic property, sound insulating property, and elastic property because of

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multiple holes 1a of the PVC sheet. The floor covering of the present invention can be used as a shape of tiles or rectangular wood plates by cutting the floor covering in a proper size, and can be used as an inner wall material of a structure as well as the floor covering such as a hypocaust underlay and a wooden floor underlay.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in carrying out the above method and in the construction set forth without departing from the spirit and scope of the invention, it is intended that all matter contained in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.